

First records of White-winged *Nyctibius leucopterus* and Rufous Potoos *N. bracteatus* in Venezuela

by Curtis A. Marantz, David Ascanio & Brian E. Daniels

Received 30 July 2010

SUMMARY.—We discuss the first records for Venezuela of White-winged *Nyctibius leucopterus* and Rufous Potoos *N. bracteatus*. These species remained virtually unknown until *c.*20 years ago, yet recent work has found both to be widely distributed in lowland forest from the Guianas south through Amazonian Brazil and west to Peru (with *N. bracteatus* also recorded in Bolivia, Ecuador and Colombia). *N. leucopterus* can be relatively numerous and its habitat preferences may not be as specialised as once thought; however, *N. bracteatus* appears to be scarce and of only local occurrence throughout its range. Despite their widespread occurrence, both species remain poorly known as a result of their nocturnal behaviour and habit of singing only a few nights per month concentrated around the full moon. We use sonograms to illustrate vocal variation and to document unpublished records of both species.

Birds arguably represent the best-known class of vertebrates with respect to biogeographic patterns, yet the distribution and abundance of many species remain poorly known across large parts of the world. Even in the most intensively studied regions, such as North America and Europe, new species are recorded almost annually (e.g., Sharrock & Grant 1982, Hamilton *et al.* 2007). In all but a very few instances, however, records of new species in these regions involve either vagrants of migratory species or precursors of range expansion, the latter often at the margin of the species' range. Most tropical regions, in contrast, remain relatively poorly known biogeographically, so even the core breeding range for some species has yet to be established. Recent discoveries most often involve cryptic species or those that are easily overlooked, and many species remain poorly known as a result of their similarity to other species, low population density, inconspicuous vocalisations, occurrence in areas difficult to survey or in regions or habitats overlooked in the past (such as islands in the Orinoco and Amazon rivers, or isolated mountain ranges), or because their activity or vocal patterns correspond to periods when few workers are in the field (e.g., nocturnal species or those most active during tropical wet seasons) (Cohn-Haft 1993, Zimmer 1997, Isler *et al.* 2001, Zimmer *et al.* 2001, Hilty & Ascanio 2009).

One of the more remarkable discoveries in recent years involved a Neotropical species, White-winged Potoo *Nyctibius leucopterus*. Unrecorded for over 150 years in its previously known range in the Atlantic Forest of eastern Brazil, the species was rediscovered 2,500 km distant in central Amazonia (Cohn-Haft 1993). Equally remarkable is that in the 20 years since *N. leucopterus* was discovered in Amazonia an emerging pattern suggests that the species occurs locally throughout much of the basin, with recent encounters in all three Guianas, Peru and at widely scattered sites across Amazonian Brazil (Cohn-Haft 1993, Parker 1993, Alvarez & Whitney 2003, Claessens *et al.* 2005, Ridgely *et al.* 2005, Ottema *et al.* 2010).

Rufous Potoo *N. bracteatus*, also virtually unknown in life for almost 150 years following its description in the mid-19th century, is likewise poorly known yet distributed widely in Amazonia (Cohn-Haft 1999). Although the species has been recorded from most

Amazonian countries, it is known from relatively few specimens and sightings at widely scattered sites across the region, from the Guianas and central Amazonian Brazil to Ecuador and northern Bolivia (Snyder 1966, Parker *et al.* 1982, 1996, Sick 1993, Cohn-Haft *et al.* 1997, 2007, Ridgely & Greenfield 2001, Cleere & Ingels 2002, Ridgely *et al.* 2005, Restall *et al.* 2006, Ingels *et al.* 2008; S. K. Herzog pers. comm.).

With a long ornithological history, primarily through the collecting efforts of William H. Phelps and his son, William H. Phelps, Jr. (Rodríguez 2006), Venezuela may be the South American country in which avian distributions are best known. With just over 1,350 species recorded in an area not much larger than the state of Texas, Venezuela ranks sixth in number of species among South American countries (Hilty 2003, Remsen *et al.* 2010). Nevertheless, 11 new species have been recorded in Venezuela since the publication of Hilty's (2003) comprehensive guide (Ascanio 2009). Of these, only Eurasian Wigeon *Anas penelope* (Williams & Beadle 2003), Yellow-nosed Albatross *Thalassarche chlororhynchos* (Marín *et al.* 2010) and Black-legged Kittiwake *Rissa tridactyla* (Kirwan *et al.* 2009) are best considered vagrants. Three of the remaining eight species are recently or yet to be described endemics to Venezuela: Carrizal Seedeater *Amaurospiza carrizalensis* (Lentino & Restall 2003), Río Orinoco Spinetail *Synallaxis beverlyae* (Hilty & Ascanio 2009) and an undescribed species of softtail *Thripophaga* sp. nov. (Hilty *et al.* in prep.). The other five species probably breed in the country.

Given the presence of much suitable Amazonian forest in the south and east of the country, and the depth at which the country's avifauna has been studied, it remained somewhat of an anomaly that *N. leucopterus* and *N. bracteatus* were unrecorded in Venezuela (see Cohn-Haft 1999).

Based on sight observations and audio recordings made during our field work in eastern Venezuela, we provide details for the northernmost records of *N. leucopterus*, a record near the northernmost limit of the range for *N. bracteatus*, and the first records of both species from Venezuela. We place these records into a geographical context using published reports of both species and unpublished observations by CAM that extend their known ranges within Amazonian Brazil. We also present sonograms of both species, both to document our records and to illustrate the vocalisations of two species that are poorly sampled vocally.

White-winged Potoo *Nyctibius leucopterus*

During field work within the northern section of the Imataca Forest Reserve, in the state of Delta Amacuro, east of El Palmar and the logging camp at Río Grande, CAM & BED searched for nocturnal birds on several nights during the full-moon cycle in mid-April 2006. Late in the evening on 11 April, we used whistled imitations of the song of *N. leucopterus* to locate a single bird in tall *terra firme* forest 14.1 km from the main road behind the logging camp at Río Grande (08°12'17"N, 61°43'47"W; c.275 m). The following night (12 April 2006), we found an apparent pair of *N. leucopterus* along a different logging road 9.6 km beyond the bridge over the río Grande (08°04'54"N, 61°37'58"W; 280 m). Two of these birds were well seen and CAM recorded their vocalisations. In both instances, we heard these birds only after imitating the species' song and, even following imitation, the birds called frequently but they sang only a few times. Both birds we saw perched in or near the forest canopy, often on exposed branches.

After imitating the descending whistle of *N. leucopterus* at each of the many stops we made in the evening on 11 April 2006, CAM heard the species' repeated *wert* or *pwit* calls. The bird subsequently sang six times, of which CAM was able to record three songs (Figs. 1A–B), but it called frequently after the whistled imitations, and many calls were recorded

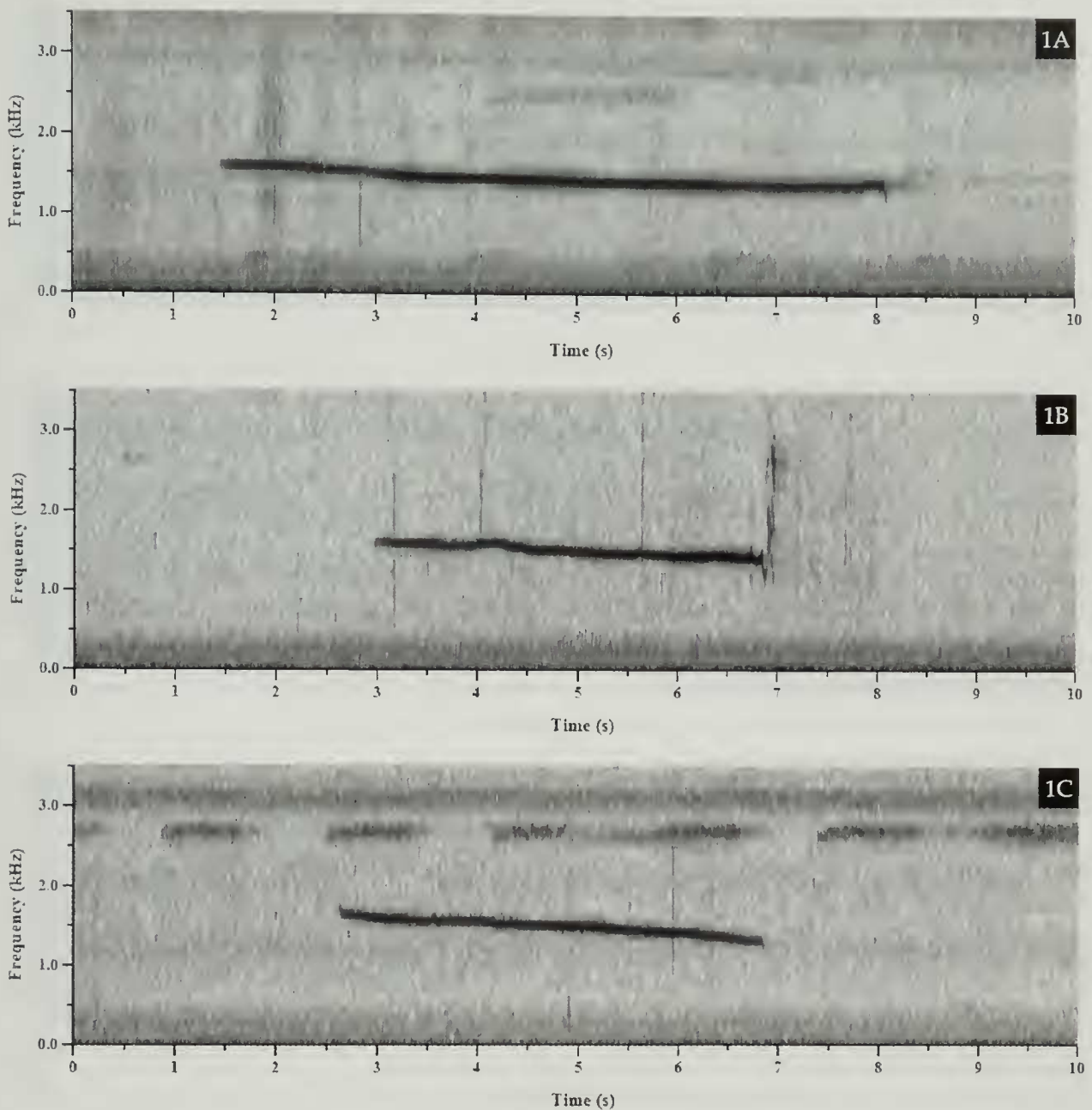


Figure 1A. Typical song by White-winged Potoo *Nyctibius leucopterus* recorded after human imitation is a clear whistle of almost seven seconds in duration that descends in frequency from 1,600 Hz to 1,400 Hz. Sonogram from recording made on 11 April 2006 at Imataca Forest Reserve, Bolívar, Venezuela (CAM field recording file 2006-BOL257). This and all other sonograms made using Raven 1.2.1 (Cornell Lab of Ornithology, Ithaca, New York) using a Hann window setting, a sample and DFT size of 1,024, and an overlap of 90%. The horizontal axis represents time in seconds and the vertical axis is frequency in kHz.

Figure 1B. Agitated song by the same White-winged Potoo *Nyctibius leucopterus* recorded after additional imitation is also a clear and slightly descending whistle of about the same frequency range, but it is shorter in duration (four seconds) and concludes with a conspicuous 'chip'. From recording made on 11 April 2006 at Imataca Forest Reserve, Bolívar, Venezuela (CAM field recording file 2006-BOL258).

Figure 1C. Song by a second White-winged Potoo *Nyctibius leucopterus* recorded after human imitation is likewise a clear but also a more strongly descending whistle (1,650 Hz descending to 1,300 Hz) of *c.* 4 seconds duration. From recording made on 12 April 2006 at Imataca Forest Reserve, Bolívar, Venezuela (CAM field recording file 2006-BOL285).

(Fig. 2A). We saw this bird once briefly as it flew overhead, and we twice obtained relatively good views through a 15–45× spotting scope while we spotlighted the bird as it perched at the edge of the canopy of trees along the road. The description below, based on audio notes recorded by CAM shortly after the observation, clearly identifies the bird as *N. leucopterus*

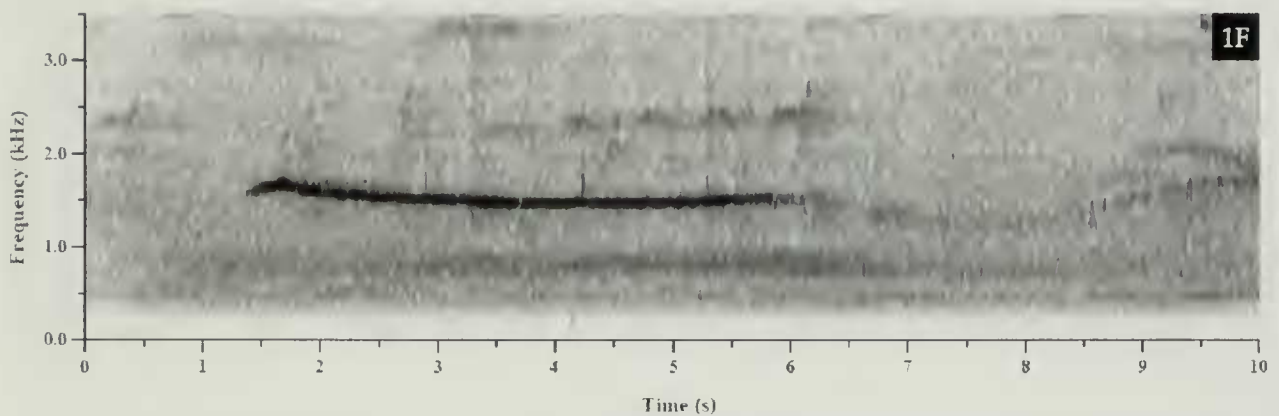
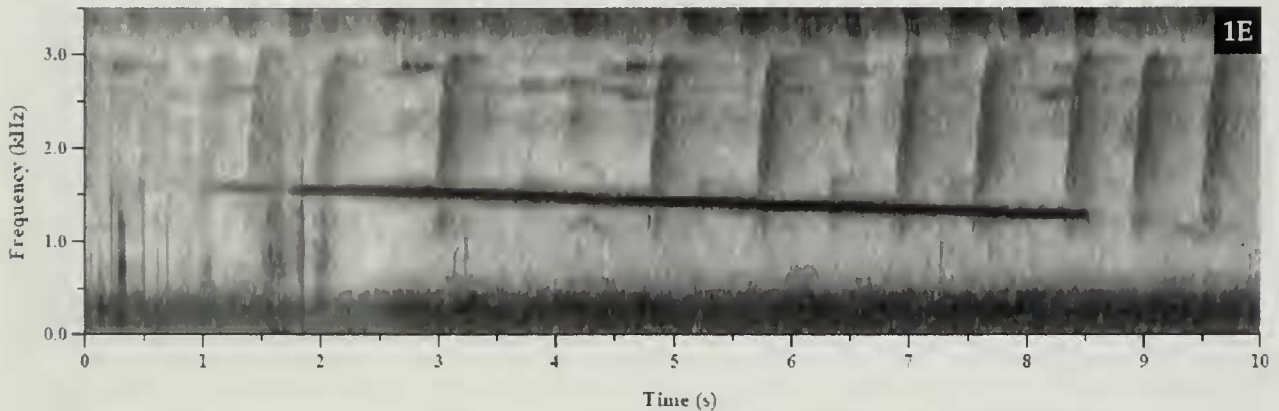
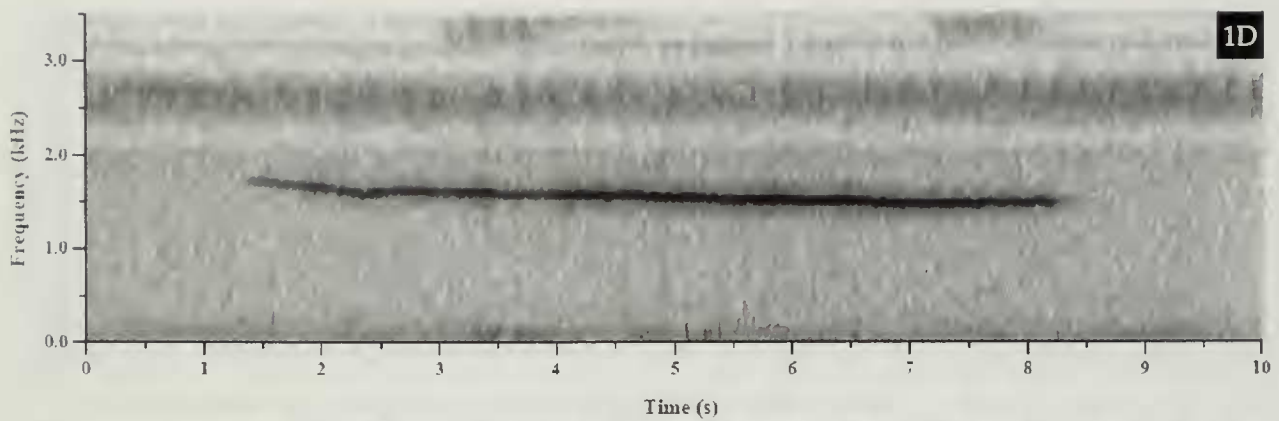


Figure 1D. Song of White-winged Potoo *Nyctibius leucopterus* north of Manaus, Amazonas, Brazil (recording by M. Cohn-Haft taken from Naka *et al.* 2008). This song is about seven seconds in duration and descends from 1,735 Hz to 1,500 Hz, a frequency range slightly higher than that of our Venezuelan recordings.

Figure 1E. Song by White-winged Potoo *Nyctibius leucopterus* after whistled imitation, recorded by CAM just before dawn on 7 December 2000 at Fazenda Toshiba, Município de Careiro do Castanho, Amazonas, Brazil (LNS 127608). This song descends gradually from 1,575 Hz to 1,275 Hz during its 7.5 seconds duration.

Figure 1F. Song of White-winged Potoo *Nyctibius leucopterus* from Floresta Nacional da Caxiuanã, Pará, Brazil, recorded by K. J. Zimmer and taken from Marantz & Zimmer (2006). This song of *c.*4.6 seconds in duration first ascends slightly from 1,570 Hz to 1,670 Hz before descending to *c.*1,500 Hz, a frequency range comparable to that of our Venezuelan recordings.

despite its being subject to the vagaries of field observation under the less than ideal conditions involved with spotlighting a bird in the forest canopy. The bird was about the size of an American Kestrel *Falco sparverius*, but with a proportionately large head, a sloping forehead, a somewhat flat-crowned appearance and what appeared to be a relatively large bill. The plumage was primarily dark, greyish brown, with a mottled appearance and a conspicuous white panel on the wing. This patch, which was relatively large and slightly curved to crescent-shaped, appeared to extend almost throughout the secondary-coverts.

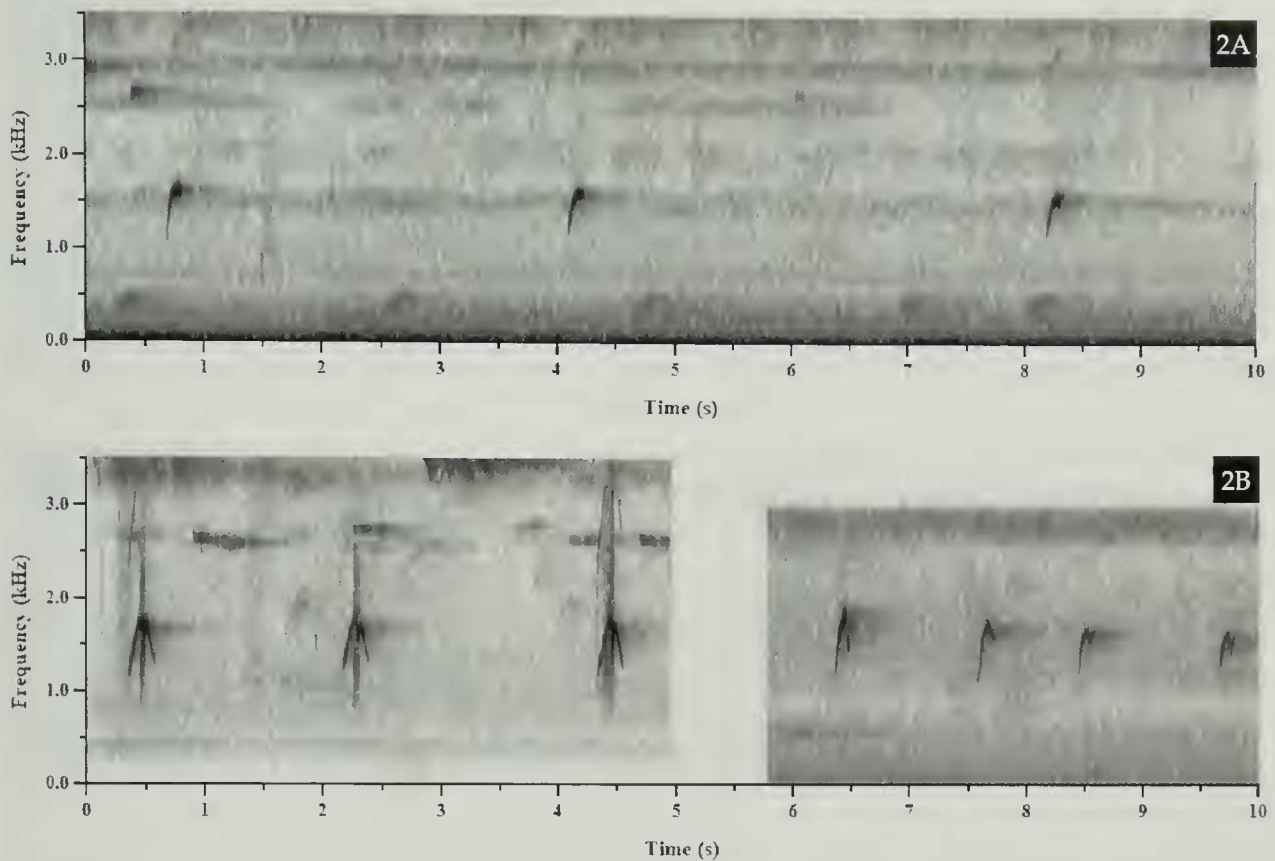


Figure 2A. Three soft *wert* calls by White-winged Potoo *Nyctibius leucopterus* recorded after human imitation of the song. Notes with an inverted 'J' shape ascend from *c.*900 to 1,700 Hz in a period of *c.*0.15 seconds. Note also that the third note in this series has a weak frequency modulation that is typical of calls at least by birds on the south bank of the Amazon River near Manaus (on basis of recordings from Marantz & Zimmer 2006 and Naka *et al.* 2008). The recording was made on 11 April 2006 at Imataca Forest Reserve, Bolívar, Venezuela (CAM field recording file 2006-BOL256).

Figure 2B. Calls by White-winged Potoo *Nyctibius leucopterus* at sites near Manaus, Amazonas, Brazil. The three calls on the left were recorded by CAM on 11 December 2000 *c.*100 km south of the Amazon River at Fazenda Toshiba, Município de Careiro do Castanho, Amazonas, Brazil (LNS 127653, taken from Marantz & Zimmer 2006). The four calls on the right were recorded by M. Cohn-Haft north of Manaus (taken from Naka *et al.* 2008). The calls from Fazenda Toshiba represent notes with an inverted 'W' shape and a small frequency modulation. In contrast, the calls recorded north of Manaus are more like those from Venezuela, with an inverted 'V' shape that lacks the frequency modulation. The frequency range of all three sets of calls is comparable, with an increase from 1,050–1,100 Hz to 1,700–1,900 Hz in a period of 0.12–0.25 seconds, but note also that the frequency range in the latter series of four calls descends slightly. The white region at the bottom of the left sonogram and at the top of the one on the right reflect filtering for the published recordings.

Also evident were fine, dark shaft-streaks extending vertically across the white wing-panel. The tail was about as long as the body, essentially parallel-sided, despite tapering inward slightly near the tip, and brownish grey with some relatively indistinct, dark barring.

The birds we encountered the following evening behaved in a similar manner in that both were silent prior to our imitating their songs, and even after these imitations, they gave primarily the soft *wert* calls; however, one bird did give several songs: a clear, descending whistle of *c.*5–7 seconds in duration (of which five examples were recorded; Fig. 1C). The bird we saw remained high in the canopy, where it perched atop an exposed snag. We did not take a detailed description, but this bird was also a small potoo with a bold, white blaze across the middle part of the wing. A second bird was calling nearby, but we saw only one of the two birds heard this evening. As a result of previous logging, the forest at this site was somewhat scrubbier than that where we found the previous night's bird, but the canopy

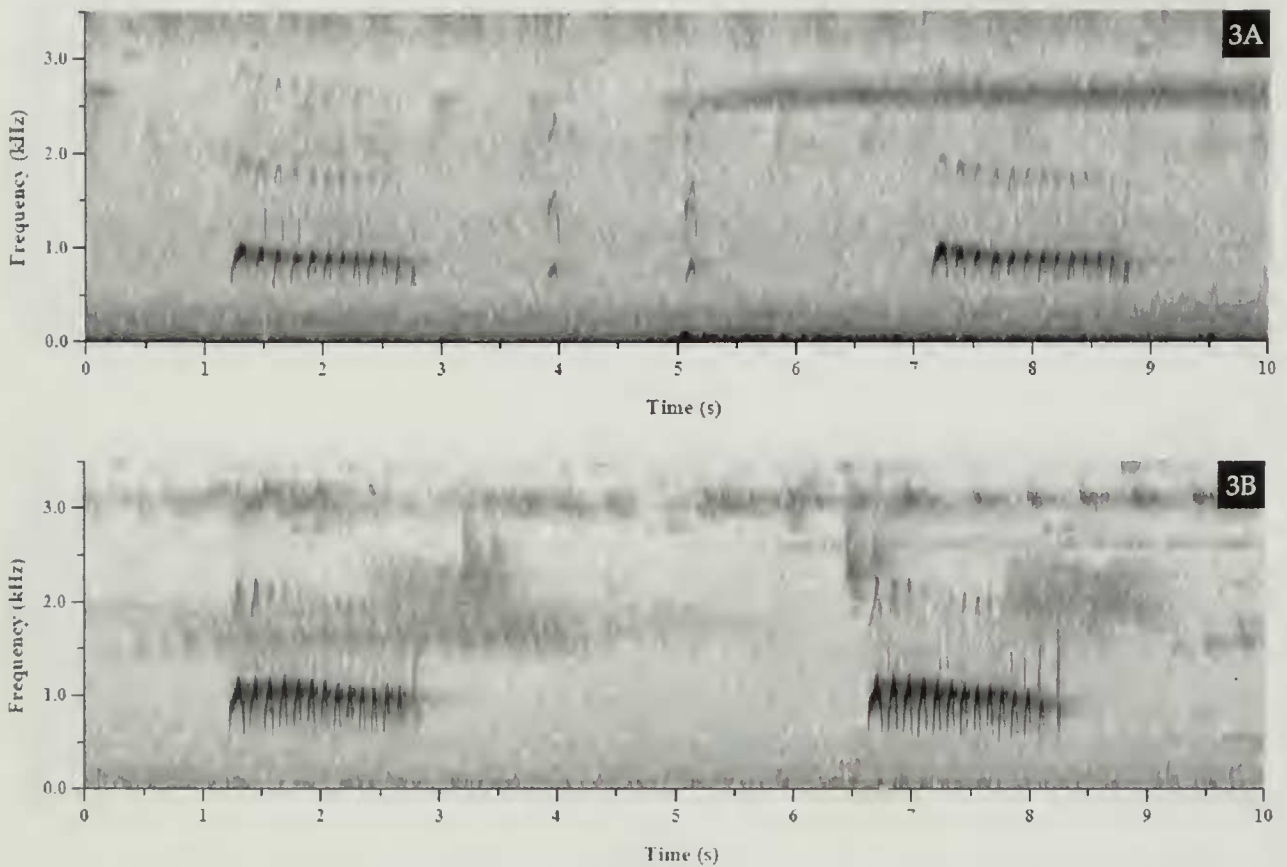


Figure 3A. Two songs and two calls by Rufous Potoo *Nyctibius bracteatus* recorded following playback of the selection on Naka *et al.* (2008). The song represents a slightly descending series of 12–13 ‘toots’ in 1.5–1.7 seconds. The first note is slightly longer in duration and has a frequency range of 600–1,100 Hz, the last is the shortest in duration and lowest in frequency, with a range of 550–925 Hz. The call represents a soft *uurt* note that is easily overlooked (examples here at 4 seconds and 5 seconds). From recording made on 12 April 2006 at Imataca Forest Reserve, Bolívar, Venezuela (CAM field recording file 2006-BOL295; duration between songs has been reduced).

Figure 3B. Two songs by Rufous Potoo *Nyctibius bracteatus* recorded by M. Cohn-Haft at Parque Nacional Jaú, Amazonas, Brazil (taken from Naka *et al.* 2008, but the duration between songs has been reduced), are almost identical to those recorded by CAM at Imataca Forest Reserve, Venezuela (see above).

was still quite tall, with the larger trees probably reaching 25–30 m. There also appeared to be a sandy component to the soils at this site that was not apparent at the first site.

Rufous Potoo *Nyctibius bracteatus*

On 21 July 2005, DA heard *N. bracteatus* singing from inside the forest along the río Cuyuní c.5 km downstream of the bridge (Road 10) over the river west of Las Claritas in southern Bolívar. The song was a well-separated series of descending ‘toots’. One individual was subsequently observed for a few seconds as it perched 4 m above the ground and 400 m inside the forest. Although the sighting was brief, this individual was obviously richer in coloration and c.30% smaller than a Common Potoo *N. griseus*. It also had an unusual shape, with the head and breast apparently more robust than the lower back, rump and tail. The head, back and wings seemed dark rufous with a few white spots apparent at the sides of the back, and the tail appeared paler and faintly barred. Although one of the earliest records of *N. bracteatus* involved a specimen taken at Cumaka (Snyder 1966), in northernmost Guyana, and apparently no more than 5 km from the Venezuelan border based on the coordinates provided by Stephens & T aylor (1985), DA’s sighting is the first

record of the species in Venezuela. Based on a lunar calendar, the moon would have been full on this date; however, DA noted that the skies were overcast during his observation.

In the evening of 12 April 2006, CAM & BED located a single *N. bracteatus* in the Imataca Forest Reserve along an old logging road 6.9 km beyond the bridge over the río Grande (08°06'23"N, 61°38'13"W; c.285 m). Like our encounters with *N. leucopterus*, we heard this bird only after playback of the song using a pre-release copy of Naka *et al.* (2008). The calls given were a soft *uurt* that was easily overlooked, but the song was a relatively rapid and slightly descending series of 12–15 owl-like 'toots' that could be described as *whooo, tooo, tooo, tooo, tooo, tooo, tooo, tooo, tooo, tooo, tooo, toot*. CAM recorded numerous calls and four songs by the bird on this evening (Fig. 3A), but without seeing it. CAM & BED returned the following afternoon and, using playback and persistence after dark, they eventually obtained good views of the bird in the midstorey of scrubby forest along a small, dry streambed. The bird wobbled back-and-forth on the branch on which it perched. The description below is based on audio notes recorded by CAM on 13 April 2006. Although the description was made over an extended period of time while studying the bird through a telescope, it nevertheless represents a field description taken while the bird was lit by spotlight, and as such subtle colour differences may exist compared to the appearance of the same bird seen in sunlight (*cf.* Cohn-Haft *et al.* 2007: Fig. 12).

Although this was a relatively small potoo, it was difficult to determine its precise size in the field. Whereas CAM estimated it to be the size of an American Kestrel *Falco sparverius* or perhaps slightly smaller, BED thought it closer in size to a Glossy-black Thrush *Turdus serranus*. Like other potoos, the bird had a characteristic upright posture, and an elongate body, with a relatively short bill, a sloping forehead and a flat-crowned appearance on a proportionately large head. The bill was quite short and broad, yet CAM estimated that it extended beyond the forehead, a distance roughly comparable to that between its base and the rear edge of the eye. The gape flanges extended back to a point just below the eye and the bristles at the base of the bill were long and conspicuous. The bird was also relatively long-winged, with the wingtips reaching about three-quarters of the way to the tip of the tail, which itself was about as long as the rest of the bird including the head. The primary projection appeared to exceed the entire length of the exposed secondaries and the tips of four primaries were visible beyond the tips of the longest secondaries in the closed wing. Seen from below, the undertail-coverts appeared to reach between one-fourth and one-third of the way to the tail tip. Also evident from below was that the tail was strongly graduated, with the outer feathers only about three-quarters the length of the inner rectrices, with the tips of four pairs visible in a stepped pattern on the underside of the tail.

The bird was bright rufous throughout, but there was a weak contrast between a deeper shade that approached rufous-chestnut on the breast and belly, and a paler or more cinnamon-rufous colour on the throat, undertail-coverts and undertail. On the upper belly, just below its junction with the breast, was a row of white semi-circles, each of which had a narrow black line above and a more jagged black line below (with this latter margin also sometimes indented along its lower border). A complementary set of white spots formed a U-shaped ring that was conspicuous along the outer edge of the undertail-coverts, which otherwise were faintly barred on a background of bright cinnamon-rufous. The outer rectrices, as seen on the undertail, had six black bands contrasting with the rufous background. The other rectrices were also barred, with the bars on the outer webs of these feathers slightly bolder than those on the inner webs.

The upperparts, wings and uppertail were reddish brown and thus marginally less rufous than the underparts. The wing-coverts were dark rufous-chestnut with a mottled or finely barred appearance, but without a bold pattern. We never noted the series of white

spots that should have been apparent on the scapulars. The remiges were also a dark reddish brown to rufous-chestnut. The secondaries appeared to have dark centres, a diffuse rufous fringe on the outer web and a mostly rufous inner web. The primaries visible in the closed wing were generally browner (less reddish) than the tail, but with a reddish-brown fringe along the outer web that was moderately conspicuous. The exposed primary tips were dark brown with a paler fringe. The uppertail was again relatively rufescent with indistinct, dark barring.

The eyes appeared to be conspicuously white with contrasting black pupils. What was visible of the lower mandible appeared to be pale, but the feathering on the chin extended nearly to the tip of the bill. We failed to note the coloration of the upper mandible, legs and feet.

More recently, during a rapid assessment of the upper río Cuyuní (Lentino *et al.* 2009), on 19 January 2008 at c.04.30 h, DA heard a single *N. bracteatus* singing c.50 m from a camp along the río Uey, a tributary of the Cuyuní, in southern Bolívar (06°04'15"N, 61°28'44"W; 150–180 m). The song was a single sharp 'toot' followed by a descending series of well-separated 'toots' that ended abruptly. This song was readily differentiated from that of Amazonian Pygmy Owl *Glaucidium hardyi*, which gives a faster and softer series of notes that fades at the end. DA searched this area over the next 12 days but heard no response to playback and he never saw the bird; however, the morning on which DA heard this bird was one of few that he was at this site when it was not raining at dawn.

Unpublished records of both species in Brazil

During field work in Brazil, CAM documented records of *N. leucopterus* at two sites in southern Amazonia not plotted by Claessens *et al.* (2005). *N. leucopterus* was encountered on multiple occasions in the Floresta Nacional do Tapajós, Pará, where it appeared to be fairly common. Singles were heard in 1999, both along the entrance road to the Base de Sucupira (near km 117 on the Santarém–Cuiabá road (BR-163); 03°21'21"S, 54°56'58"W) on 24 August, on 19–20 September, and again on 5 October, and also along a logging road at km 83 on the BR-163 on 25 and 29 August (with two heard and one seen on the first date). At the first of these sites, a narrow road traversed tall *terra firme* forest, but the forest along the logging road at km 83 was scrubbier and the canopy was more uneven as a result of selective logging (see Henriques *et al.* 2003 for a more detailed description). At another southern Amazonian site, CAM repeatedly heard and recorded the vocalisations of up to three *N. leucopterus* on 7–14 December 2000 at Fazenda Toshiba, 8 km east-northeast of Careiro do Castanho in Amazonas (03°47'41"S, 60°17'48"W). The birds at this site were along a narrow road through *terra firme* forest with a canopy of 25–30 m and a few taller emergents. One bird was within 200 m of the forest edge but the others were further into the forest. This site, c.100 km south of Manaus, is in a region of predominately white-water rivers, and thus unlike most sites where we and others have found the species. Audio recordings from both sites (e.g., Fig. 1E), as well as one from the Floresta Nacional do Caxiuanã (Fig. 1F), were included in the compilation by Marantz & Zimmer (2006), and the records from the Floresta Nacional do Tapajós were mentioned in Henriques *et al.* (2003). Taken together, these records represent a significant range extension for the species along the south bank of the Amazon across much of the south-east part of the basin. As a whole, our recent records of the species from southern Amazonia come from a variety of sites and a suite of habitats, all in *terra firme* forest and sometimes far from water. None of these encounters were at sites with a sandy component to the soil, but at least some of the birds at the Floresta Nacional do Tapajós, and those at Fazenda Toshiba, were along roads through disturbed or selectively logged forest.

Predating the Venezuelan records of *N. bracteatus*, CAM & M. Cohn-Haft heard the species under a nearly full moon on 31 December 1998 near the indigenous community of Iá-Mirim (00°15'45"N, 66°38'25"W), at km 85 on the BR-307, the road from São Gabriel da Cachoeira to Cucuí. Cohn-Haft was able to record the songs of this bird, but despite extensive searching we were unable to obtain a visual confirmation because the bird was singing from the mid levels of an especially dense part of the forest. Although we did not examine closely the habitat where we heard the bird, the region in general is one in which low-stature *terra firme* forest forms a matrix with swampy woodlands and savannas on sandy soils (locally termed *campinarana* or Amazonian *caatinga*), and thus a close match to the habitat for the species described by Alvarez & Whitney (2003). This site is c.60 km south-west of the Venezuelan border and barely more than 100 km from the nearest point in Colombia.

Discussion

We report the northernmost records of *N. leucopterus* and almost the northernmost for *N. bracteatus*, the first records of both species in Venezuela, and previously unpublished records of these species in southern Amazonian Brazil (*N. leucopterus*) and in north-west Brazil (*N. bracteatus*). Although both species remain poorly known, an emerging pattern suggests that these potoos are widespread in Amazonia (as predicted by Cohn-Haft 1999), where they occur from French Guiana west to eastern Peru and across much of Amazonian Brazil (see Claessens *et al.* 2005 for a map of localities for *N. leucopterus*). *N. bracteatus* alone is known from Bolivia, Ecuador, and from at least historical records attributed to Colombia (in the 'Bogotá' collections) (Hilty & Brown 1986, Ridgley & Greenfield 2001; S. K. Herzog pers. comm., T. M. Donegan pers. comm.), and *N. leucopterus* was recorded recently in Surinam, where *N. bracteatus* is unknown (Ottema *et al.* 2010).

Although both species were virtually unknown in life until c.20 years ago (e.g., Collar & Andrew 1988), the recent discovery of their vocalisations, their preferred habitats, and that they sing primarily during the short period of the full moon (Cohn-Haft 1993), has resulted in the number and geographic spread of records of both species increasing rapidly. Given their known distribution, we have no doubt that both species will soon be found in Amazonian Colombia, *N. bracteatus* in Surinam and *N. leucopterus* in Ecuador. Moreover, recent reports of *N. leucopterus* in western Brazil in the states of Acre and southernmost Amazonas (Alvarez & Whitney 2003) further suggest that the species occurs in neighbouring Bolivia, where there is already at least one unpublished record of *N. bracteatus* by the late T. A. Parker (S. K. Herzog pers. comm.). The picture that has emerged over the past 20 years supports Cohn-Haft's (1999) contention that both species occur throughout the lowlands of Amazonia.

Cohn-Haft (1993) speculated that *N. leucopterus* is probably common in the canopy of the *terra firme* forests north of Manaus, which is supported by encounters by CAM with the species at the Floresta Nacional do Tapajós, Fazenda Toshiba and Imataca Forest Reserve, all involving multiple birds found opportunistically amid extensive forest. Given that the species appears to be at least relatively numerous where it does occur (see also Ridgely *et al.* 2005), we agree with Claessens *et al.* (2005) that its recent discovery in Amazonia combined with the relative scarcity of encounters since its rediscovery 20 years ago probably reflects the paucity of field work conducted in tropical forests at night and that potoos sing consistently during only a few nights per month at the peak of the full-moon cycle (Cohn-Haft 1993), but it is possible that the species is also somewhat localised. Further complicating the discovery of the Venezuelan birds was that even at the peak of the full

moon during the latter part of the dry season, these birds sang only occasionally and only after playback of recordings or whistled imitations.

Some workers have suggested that *N. leucopterus* occurs primarily in forests with either a sandy component to the soil, deeply weathered clays in black-water regions, or other nutrient-poor soils (Alvarez & Whitney 2003, Whitney *et al.* 2003), and that it prefers primary forest (Peres & Whittaker 1991, Cohn-Haft 1993, 1999, Ridgely *et al.* 2005). However, our observations in somewhat disturbed forest support encounters by other workers who have found this species at forest edge or in fragments, which together suggest that *N. leucopterus* can tolerate some disturbance. We have also found this species in a variety of forest types in both black- and white-water regions, and on a variety of soil types, so it may be less of a specialist than sometimes thought, provided that an intact forest structure and tall trees remain.

Contrasting our experience with *N. leucopterus*, which appears to be relatively numerous where it does occur, *N. bracteatus* appears either local, more restricted in its habitat preferences, rarer overall and more sparsely distributed across its broad Amazonian range, or not particularly vocal. Despite moderate familiarity with its vocalisations, CAM has heard *N. bracteatus* only twice during extensive field work across much of Amazonia, and he has seen it only once (compared with over a dozen encounters of *N. leucopterus* at four widely separated sites). This species has likewise been considered rare to uncommon even in the regions where it has been recorded (Parker *et al.* 1982, 1994, Ridgely & Greenfield 2001, Ridgely *et al.* 2005, Braun *et al.* 2007, Ingels *et al.* 2008). Our observations further support the contention of Alvarez & Whitney (2003) that *N. bracteatus* favours forests with either a sandy component to the soil, deeply weathered clays in black-water regions or other nutrient-poor soils, so its habitat requirements may be more specialised than those of *N. leucopterus*. M. Cohn-Haft (pers. comm.) further clarified that the species occupies principally in understorey and mid levels of *terra firme* forest, but that within this forest type, *N. bracteatus* frequents both continuous tall forest and *caupinarana* vegetation growing on saturated soils with many palms in the understorey. Also, unlike *N. leucopterus*, *N. bracteatus* may occur in well-developed second growth because it does not depend on the truly large trees and tall canopy favoured by *N. leucopterus* (M. Cohn-Haft pers. comm.). As in the case of *N. leucopterus*, however, familiarity with the song and extensive field work on moonlight nights using playback seems to be key to finding the species (see Ingels *et al.* 2008).

Available recordings of the vocalisations of both species are too few to even begin to document geographic variation, but it may be useful to provide a summary of the vocalisations that we have noted (see also Figs. 1–3). We found the song of *N. leucopterus* to be a clear, descending whistle of 4–7 seconds that ranges from 1,750–1,275 Hz, and as such, the descriptions by Cohn-Haft (1993, 1999) are accurate apart from the published duration of 3.5–4.0 seconds being shorter than most of the songs we have recorded in Amazonia. Still, given that the songs in Figs. 1A–B represent the same individual, it would appear both that song duration is more variable individually than geographically and that a terminal note at the end of the song may reflect aggression following playback or a territorial encounter. Similarly, the more steeply descending song in Fig. 1C seems to reflect either individual variation or the motivational state of the bird. The few songs by birds recorded in the Brazilian Atlantic forest that have been examined spectrographically were shorter in duration, slightly lower in frequency, and less obviously descending than those of Amazonian birds (Whitney *et al.* 2003); nevertheless, when heard in the field, these two populations sound remarkably similar (Whitney *et al.* 2003, Costa *et al.* 2010). We would describe the species' call as a soft *wert* or *pwit* note, and thus perhaps less sharp

than suggested by the published descriptions of *bweep* (Cohn-Haft 1999, Costa *et al.* 2010), yet the calls in our Venezuelan recordings (Fig. 2A) closely match those shown for a bird recorded in the Brazilian Atlantic Forest (Costa *et al.* 2010: Fig. 3). Even fewer recordings exist of the song of *N. bracteatus*, but a spectrographic comparison of songs from Venezuela and north-western Brazil (Figs 3A–B) reveals that they are almost identical, and both match closely a published description of the species' song (Cohn-Haft 1999) in being a rapid and slightly descending series of 12–15 sharp 'toots' in the range of 500–1,200 Hz and lasting c.1.5–1.75 seconds.

In conclusion, we stress, as did Cohn-Haft (1993), the importance of avifaunal surveys, which will continue to reveal poorly known and, potentially, new species, even at some of the best-known Neotropical sites, such as the Imataca Forest Reserve east of El Palmar, where ornithologists and birdwatchers have made routine visits since the 1970s (e.g., Goodwin 2003).

Acknowledgements

Venezuelan field work by CAM formed part of an International Postdoctoral Fellowship sponsored by the National Science Foundation (#502407) through the Instituto de Zoología Tropical, Universidad Central de Venezuela, Caracas. He thanks Jorge L. Pérez Emán of the Instituto de Zoología Tropical for collaboration in this project and logistical support. Brazilian field work by CAM was sponsored by David C. Oren and the late Jacques M. E. Vielliard through the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), and logistical support was provided by José Guilherme da Silva (Fazenda Toshiba), Selma Melgaço and Luiza Magalli Pinto Henriques (Floresta Nacional do Tapajós), Mario Cohn-Haft (São Gabriel da Cacheira), and David Oren, Renata de Melo Valente and the Museu Goeldi (Estação Científica Ferreira Penna, Floresta Nacional do Caxiuanã). Miguel Lentino and Margarita Martínez of the Colección Ornitológica de Phelps provided assistance in literature searches, Fernando Pacheco sent copies of difficult to find papers and provided information on Brazilian records of these species, and Marcos Salcedo provided a copy of the RAP report from the upper río Cuyuní expedition. Sebastian Herzog provided information on Bolivian records, Thomas Donegan insight concerning reports of these species in Colombia, Davis Finch and Mark Robbins data on Guianan records, and Diego Calderón-Franco helped track down references. All recordings by CAM have been or will be archived at the Macaulay Library (LNS), Cornell Lab of Ornithology, Ithaca, New York, with copies of the Venezuelan recordings also deposited at the Colección Ornitológica de Phelps, Caracas, and those of the Brazilian recordings at the Arquivo Sonoro Prof. Elias Pacheco Coelho, Laboratório de Bioacústica, Universidade Federal do Rio de Janeiro, Brazil. CAM thanks Aline Y. O. Matsuo for her patience and understanding during his long absences in the field, and Michael Patten, Louis Bevier, Guy Kirwan, Mario Cohn-Haft, Nigel Cleere and Christopher J. Sharpe for comments on earlier versions of the manuscript. Mario's insight into various aspects of potoo biology was particularly helpful. DA thanks Anabel Rial of Conservation International, Venezuela, and Carlos Lasso and Josefa C. Señaris of the Museo de Historia Natural La Salle for the invitation to participate in the RAP Cuyuní 2008.

References:

- Alvarez, J. A. & Whitney, B. M. 2003. New distributional records of birds from white-sand forests of the northern Peruvian Amazon, with implications for biogeography of northern South America. *Couder* 105: 552–566.
- Ascanio, D. 2009. Field checklist of the birds of Venezuela. www.ascaniobirding.com/pdf/checklists/Venezuela.pdf (accessed 28 July 2010).
- Braun, M. J., Finch, D. W., Robbins, M. B. & Schmidt, B. K. 2007. *A field checklist to the birds of Guyana*. Second edn. Smithsonian Institution, Washington DC.
- Claessens, O., Pelletier, V. & Ingels, J. 2005. First records of White-winged Potoo *Nyctibius leucopterus* for French Guiana. *Alauda* 73: 61–68.
- Cleere, N. & Ingels, J. 2002. First record of the Rufous Potoo *Nyctibius bracteatus* and in-flight drinking by the Semi-collared Nighthawk *Lurocalis semitorquatus* in French Guiana. *Bull. Brit. Orn. Cl.* 122: 154–155.
- Cohn-Haft, M. 1993. Rediscovery of the White-winged Potoo (*Nyctibius leucopterus*). *Ank* 110: 391–394.
- Cohn-Haft, M. 1999. Family Nyctibiidae (potoos). Pp. 288–301 in del Hoyo, J., Elliott, A. & Sargatal, J. (eds.) *Handbook of the birds of the world*, vol. 5. Lynx Edicions, Barcelona.
- Cohn-Haft, M., Whittaker, A. & Stouffer, P. C. 1997. A new look at the "species-poor" Amazon: the avifauna north of Manaus, Brazil. Pp. 205–235 in Remsen, J. V. (ed.) *Studies in Neotropical ornithology honoring Ted Parker*. *Orn. Monogr.* 48.
- Cohn-Haft, M., Pacheco, A. M. F., Bechtoldt, C. L., Torres, M. F. N. M., Fernandes, A. M., Sardelli, C. H. & Macêdo, I. T. 2007. Inventário ornitológico. Pp. 145–178 in Rapp Py-Daniel, L., Deus, C. P., Henriques,

- A. L., Pimpão, D. M. & Ribeiro, O. M. (orgs.) *Biodiversidade do médio Madeira: bases científicas para propostas de conservação*. Ed. INPA, Manaus.
- Collar, N. J. & Andrew, P. 1988. *Birds to watch*. International Council for Bird Preservation, Cambridge, UK.
- Costa, T. V. V., Andretti, C. B., Laranjeiras T. O. & Rosa, G. A. B. 2010. Discovery of White-winged Potoo *Nyctibius leucopterus* in Espírito Santo, Brazil, with remarks on its distribution and conservation in the Atlantic Forest. *Bull. Brit. Orn. Cl.* 130: 260–265.
- Goodwin, M. L. 2003. *Birding in Venezuela*. Fifth edn. Lynx Edicions, Barcelona.
- Hamilton, R. A., Patten, M. A. & Erickson, R. A. (eds.) 2007. *Rare birds of California*. Western Field Ornithologists', Camarillo, CA.
- Henriques, L. M. P., Wunderle, J. M. & Willig, M. R. 2003. Birds of the Tapajós National Forest, Brazilian Amazon: a preliminary assessment. *Orn. Neotrop.* 14: 307–338.
- Hilty, S. L. 2003. *Birds of Venezuela*. Princeton Univ. Press.
- Hilty, S. L. & Ascanio, D. 2009. A new species of spintail (Furnariidae: *Synallaxis*) from the Río Orinoco of Venezuela. *Auk* 126: 485–492.
- Hilty, S. L. & Brown, W. L. 1986. *A guide to the birds of Colombia*. Princeton Univ. Press.
- Hilty, S. L., Ascanio, D. & Whittaker, A. In prep. A new species of softtail (Furnariidae: *Thripophaga*) from the delta of the Orinoco River in Venezuela.
- Ingels, J., Cleere, N., Pelletier, V. & Héquet, V. 2008. Recent records and breeding of Rufous Potoo *Nyctibius bracteatus* in French Guiana. *Cotinga* 29: 144–148.
- Isler, M. L., Alvarez, J. A., Isler, P. R. & Whitney, B. M. 2001. A new species of *Percnostola* antbird (Passeriformes: Thamnophilidae) from Amazonian Peru, and an analysis of species limits within *Percnostola rufifrons*. *Wilson Bull.* 113: 164–176.
- Kirwan, G. M., Calderón, D., Minns, J. & Roesler, I. (compilers) 2009. Neotropical notebook. *Cotinga* 31: 158–174.
- Lentino, M. & Restall, R. 2003. A new species of *Amaurospiza* blue seedeater from Venezuela. *Auk* 120: 600–606.
- Lentino, M., Salcedo, M. & Ascanio, D. 2009. Aves de la cuenca alta del río Cuyuní, estado Bolívar: resultados del RAP Alto Cuyuní 2008. Pp. 156–163 in Lasso, C. A., Señaris, J. C., Rial, A. & Flores, A. L. (eds.) *Evaluación rápida de la biodiversidad de los ecosistemas acuáticos de la cuenca alta del río Cuyuní, Guayana Venezolana*. RAP Bull. Biol. Assessment 55. Conservation International, Washington DC.
- Marantz, C. A. & Zimmer, K. J. 2006. *Bird voices of Alta Floresta and southeastern Amazonian Brazil*. CDs. Cornell Lab of Ornithology, Ithaca, NY.
- Marín, G., Carvajal M., Y. & Muñoz G., J. 2010. Primer registro de *Thalassarche chlororhynchos* en la cuenca del Mar Caribe. *Cotinga* 32: 159–160.
- Naka, L. N., Stouffer, P. C., Cohn-Haft, M., Marantz, C. A., Whittaker, A. & Bierregaard, R. O. 2008. *Voices of the Brazilian Amazon*, vol. I. CDs. Ed. INPA, Manaus.
- Ottema, O., Ribot, J. H. & Spaans, A. 2010. Species lists of birds for South American countries and territories: Suriname. www.museum.lsu.edu/~Remsen/SACCCountryLists.html (accessed 28 July 2010).
- Parker, T. A. 1993. Bird species recorded in the Kanuku Mountain Region. Pp. 49–60 in Parker, T. A., Foster, R. B., Emmons, L. H., Freed, P., Forsyth, A. B., Hoffman, B. & Gill, B. D. (eds.) *A biological assessment of the Kanuku Mountain Region of southwestern Guyana*. RAP Working Papers 5. Conservation International, Washington DC.
- Parker, T. A., Donahue, P. K. & Schulenberg, T. S. 1994. Appendix 3. Birds of the Tambopata Reserve (Explorer's Inn Reserve). Pp. 106–124 in Foster, R. B., Carr, J. L. & Forsyth, A. B. (eds.) *The Tambopata-Candamo Reserved Zone of southeastern Perú: a biological assessment*. RAP Working Papers 6. Conservation International, Washington DC.
- Parker, T. A., Parker, S. A. & Plenge, M. A. 1982. *An annotated checklist of Peruvian birds*. Buteo Books, Vermillion, SD.
- Parker, T. A., Stotz, D. F. & Fitzpatrick, J. W. 1996. Ecological and distributional databases. Pp. 131–436 in Stotz, D. F., Fitzpatrick, J. W., Parker, T. A. & Moskovits, D. K. (eds.) *Neotropical birds: ecology and conservation*. Univ. of Chicago Press.
- Peres, C. A. & Whittaker, A. 1991. Annotated checklist of the bird species of the upper Rio Urucu, Amazonas, Brazil. *Bull. Brit. Orn. Cl.* 111: 156–171.
- Remsen, J. V., Cadena, C. D., Jaramillo, A., Nores, M., Pacheco, J. F., Robbins, M. B., Schulenberg, T. S., Stiles, F. G., Stotz, D. F. & Zimmer, K. J. 2010. Species lists of birds for South American countries and territories. www.museum.lsu.edu/~Remsen/SACCCountryLists.html (accessed 28 July 2010).
- Restall, R., Rodner, C. & Lentino, M. 2006. *Birds of northern South America*. Christopher Helm, London.
- Ridgely, R. S. & Greenfield, P. J. 2001. *The birds of Ecuador*. Cornell Univ. Press, Ithaca, NY.
- Ridgely, R. S., Agro, D. & Joseph, L. 2005. Birds of Iwokrama Forest. *Proc. Acad. Nat. Sci. Philadelphia* 154: 109–121.
- Rodriguez, J. A. 2006. *El viajero de las aves: la obra científica de William H. Phelps (1937–1965)*. Ed. PPC, Caracas.
- Sharrock, J. T. R. & Grant, P. J. 1982. *Birds new to Britain and Ireland*. T. & A. D. Poyser, Calton.
- Sick, H. 1993. *Birds in Brazil: a natural history*. Princeton Univ. Press.

- Snyder, D. E. 1966. *The birds of Guyana (formerly British Guiana)*. Peabody Museum, Salem, MA.
- Stephens, L. & Traylor, M. A. 1985. *Ornithological gazetteer of the Guianas*. Mus. Comp. Zool., Harvard Univ., Cambridge, MA.
- Whitney, B. M., Pacheco, J. F., Silveira, L. F. & Laps, R. R. 2003. Rediscovery of *Nyctibius leucopterus* (White-winged Potoo) in the Atlantic Forest of Brazil. *Ararajuba* 11: 1–4.
- Williams, R. S. R. & Beadle, D. D. 2003. Eurasian Wigeon *Anas penelope* in Venezuela: a new bird for South America. *Cotinga* 19: 71.
- Zimmer, K. J. 1997. Species limits in *Craniolenca vulpina*. Pp. 849–864 in Remsen, J. V. (ed.) *Studies in Neotropical ornithology honoring Ted Parker*. *Orn. Monogr.* 48.
- Zimmer, K. J., Whittaker, A. & Oren, D. C. 2001. A cryptic new species of flycatcher (Tyrannidae: *Suiriri*) from the Cerrado region of central South America. *Ank* 118: 56–78.

Addresses: Curtis A. Marantz, Instituto de Zoologia Tropical, Universidad Central de Venezuela, Caracas, Venezuela, and Macaulay Library, Cornell Lab of Ornithology, Ithaca, New York, USA, e-mail: cam233@cornell.edu. David Ascanio, Apartado Postal 78006, La Urbina 1074, Caracas, Venezuela, e-mail: david@ascaniobirding.com. Brian E. Daniels, BonTerra Consulting, 3452 East Foothill Blvd., Suite 420, Pasadena, California, USA, e-mail: BDaniels@bonterraconsulting.com